In the Claims

Please delete claims 17 to 37 without prejudice and substitute new claims 38 to 57.

Claims 1-16 (cancelled)

Claims 17-37 (cancelled)

38. (New) An element for an optical communication system, the element being arranged to introduce a variable differential group delay between orthogonal polarization modes of an input optical signal, thereby to compensate for polarisation mode dispersion in the optical communication system, the element comprising:

a birefringent, micro-structured optical waveguide; and

a controller arranged to adjust the birefringence of the waveguide, thereby to vary the differential group delay introduced.

39. (New) An element according to claim 38, wherein the waveguide is an optical fibre exhibiting a high degree of birefringence.

40. (New) An element according to claim 39, wherein the optical fibre is one selected from the group consisting of: a holey fibre (HF); a side hole fibre (SHF) and a photonic crystal fibre (PCF).

41. (New) An element according to claim 39, wherein the optical fibre comprises a non-linear fibre grating.

42. (New) An element according to claim 41, wherein the fibre grating is a fibre Bragg grating (FBG).

43. (New) An element according to claim 42, wherein the optical fibre is formed to hold rods of a thermally sensitive material formed within the micro-structure of the fibre and wherein the controller is arranged to adjust the birefringence of the fibre by subjecting the thermally sensitive rods to heat.

44. (New) An element according to claim 43, wherein the fibre is tapered over at least part of its length.

45. (New) An element according to claim 43, wherein the controller is arranged to provide a thermal gradient over at least part of the length of the fibre.

46. (New) An element according to claim 39, wherein the fibre comprises micro-holes filled with a material and arranged such that a fundamental transmission mode of the fibre interacts with the material to induce an electro-optic effect thereby altering the mode shape and birefringence of the fibre.

47. (New) A variable differential group delay comprising the element of claim 38 and a sensor arranged to sense the difference in group velocities between the orthogonal polarisation modes of an optical signal; the sensor being coupled to the controller to cause the controller to adjust the birefringence of the waveguide to counteract the sensed difference in group velocities.

48. (New) A method of compensating for polarisation mode dispersion in an optical communication system, the method comprising:

providing a birefringent, micro-structured optical waveguide arranged to introduce a differential group delay between orthogonal polarisation modes of an input optical signal, and

adjusting the birefringence of the waveguide, thereby to vary the differential group delay introduced.

49. (New) A method according to claim 48, wherein the waveguide is an optical fibre exhibiting a high degree of birefringence.

50. (New) A method according to claim 49, wherein the optical fibre is one selected from the group consisting of: a holey fibre (HF); a side hole fibre (SHF) and a photonic crystal fibre (PCF).

51. (New) A method according to claim 49 wherein the optical fibre comprises a non-linear fibre grating.

52. (New) A method according to claim 51, wherein the fibre grating is a fibre Bragg grating (FBG).

53. (New) A method according to claim 52, wherein the optical fibre is formed to have rods of a thermally sensitive material formed within the micro-structure of the fibre and wherein the step of adjusting the birefringence is performed by subjecting the thermally sensitive rods to heat.

54. (New) A method according to claim 53, wherein the fibre is tapered over at least part of its length.

55. (New) A method according to claim 53, wherein a thermal gradient is provided over at least a part of the length of the fibre.

56. (New) A method according to claim 49, wherein the fibre comprises micro-holes filled with a material and arranged such that a fundamental transmission mode of the fibre interacts with the material to induce an electro-optic effect thereby altering the mode shape and birefringence of the fibre.

57. (New) A method according to claim 48, comprising sensing the difference in group velocities between orthogonal polarization modes of an input optical signal and performing the step of adjusting the birefringence of the waveguide to counteract the sensed difference in group velocities.